
A Sharable Content Object Reference Model (SCORM) Initiation: An Experience

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Abstract

The era of information and communication technology has created web-based learning environment and led to the digital and virtual educational systems. With e-learning mode classrooms have been changed to virtual classroom. Libraries can be seen in the midst of so many innovations, progressing towards their new vision and goal to be the part of the virtual world in its true sense, where there is no barrier between information and information seekers. Libraries are undergoing phase of developmental changes even unaware of so many challenges. Today's hybrid libraries are favouring electronic learning objects and facilitating end users with the help of innovative semantic interoperability. Extensive use of online resources in the developing countries like India, which is geographically very vast and varied, provoked the authorities of educational system to incorporate web-based learning system to facilitate the distant user who are physically deprived from the learning in form of education. Various institutions and databases are providing access to e-learning objects, though they have their own ways for creating metadata. The precision value is quite low at standardized retrieval points which also vary from interface to interface, therefore, to share all these resources and for their easy exchange, a set of rules and specifications are required. Here comes Sharable Content Object Reference Model in picture, a set of rules and specification developed by Advanced Distributed Learning for setting the compatibility between e-learning object and learning management systems or tools. This paper has been divided into three sections. First one discusses the holistic nature of problem in terms of spatial changes in library architecture, change in the definition of learning object and perception and training problems of the librarians in the current scenario. Second section includes the six case studies with respect to websites of Google, Wikipedia, Merlot Open source learning project, Massachusetts institute of

Technology, social sciences research network and consortium of educational communication. Third section carries over the insight of the first two sections to throw light on the key role of standards for the proper integration of learning management systems specifically Sharable Content Object Reference Model and the level of awareness and preparation vis-à-vis the same.

This paper has been motivated by a quite familiar sense of discomfort that permeates among the professionals of library science and knowledge seekers (of cyberspace) particularly living in non-metropolitan areas and those educational institutions serving the vernacular sections of the society. This is accentuated by persistent failures of librarians of such institutions to go beyond the superfluous automation of library management systems and continuous digital divisions in the sociological structures of knowledge. Internet has created a feeling that knowledge belongs to one and all without the barriers of culture, country, caste and creed. Information in various multimedia formats is being uploaded on the websites which are accumulated by search engines as well as social networking systems on the Internet for optimum retrieval. Though, the metadata used by these electronic objects providers need to be standardized in more efficient and effective way for information sharing.

The focus of this study is not towards providing the solutions rather it is meant to create a multi-dimensional framework of a professional working in this area right from the bottom to the top. The main theme of this paper is distributed among three sections.

- 1. Section one** broadly discusses the conceptual framework as well as difficulties of librarians sitting in the peripheral areas both in digital and developmental sense.
- 2. Section two** tries to collate six case studies of the best possible and popular methods of accessing and retrieval of information through Google search engine, wikipedia, www.merlot.org, www.mit.edu, social sciences research network and couple of years back launched learning object repository of CEC-UGC.
- 3. Section three** assimilates the experiences of first two sections into an analytical approach that views SCORM with relative scorn, as well as wonder. SCORM is a standard for knowledge packaging with respect to e-content. It is an initiative

popularized by Advanced Distributive Learning (ADL) Project launched by the Department of Defence, United States of America. Today, within India, it may not be a popular choice but within next few years, it does carry the seeds of extreme popularity in the information world. This section actually deals with predicament of Indian situation vis-à-vis this possible paradigm shift.

Section One

Development in computers, microelectronics and communication technology have radically changed the library and information environment. The days of stand-alone libraries have gone and shifted to library and information network available via the Internet, which provides users with a seamless connection to internet based services. Virtual libraries can be rightly said 'libraries without walls' where there is no architectural and physical existence of libraries. It will exist as virtual space in the millions of computers integrated by internet.

Electronic objects are prominently being used but still so many fundamental issues are yet to be established:

- ◆ the proper definition of learning object;
- ◆ the form of standard pathways of knowledge where knowledge does not get lost anytime or anywhere; and
- ◆ the terms of proper designing of learning management system.

Let us discuss these issues one by one. The primary task of a librarian⁴ has undergone a paradigm shift. The spatial architecture has gone beyond the control because information can be uploaded from anywhere to the web. It is like an ocean where there are so many canals of information in which traffic is both way possible. The paradox is that there are many pathways but there is no standard gateway. (Even if there are some, there is lack of consensus on them).

The system of storing and retrieving of bibliographical details are inadequate on the web. The methodology of finding information varies from one Learning Object (LO) to another. Before we discuss that, we need to have a little bit clarity about the concept of learning object.⁵

“Currently, there are as many definitions of LOs as there are users, like:

1. “For this standard (Draft Standard for learning Object Metadata v6.1), a learning object is defined as any entity , digital or non digital, that may be used for learning, education or training” (IEEE Learning Technology Standards Committee)
2. “...a learning Object ... (is) ‘any digital resource that can be reused to support learning. This definition includes anything that can be delivered across the network on demand , be it large or small.....(Wiley 2002)
3. “(A learning Object) is defined as the smallest independent structural experience that contains an objective, a learning activity and an assessment.”(L’Allier 1997)

To be precise, a librarian needs to give more focus on the learning object repositories rather than focusing on established standards for books, magazines, journals etc. The actual state of library automation system is quite unsatisfactory because the entire process of automation has been narrowed down to making only computerized versions of library catalogues and issue/return registers. Even the high speed bandwidth that is the crux of today’s libraries is mainly present within the computer laboratories.

The problem does not end here rather a totally different dimension of libraries has been emerged by using state-of-the-art technology i.e. when a learning object, knowledge system, course, presentation or paper is created, it can be uploaded to the internet immediately but without the participation of a qualified librarian who knows the archival importance of digital data, this venture can be quite short-sighted as well as wrongly premised. Harmonization of web accessibility standard is the key to making an accessible web. It is the way forward to exchange and share the information without limitation of geographical space. Now the issue of metadata becomes the issue of cross cultural, cross frontier, cross continental and universal.

Section Two

It is quite essential to carry over the conceptual framework in the form of the most frequent and relevant attempts of data location particularly at the local level because the difference between the praxis and theory is quite interdependent in this case. Generally, the attempts are focused in following ways:

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- I A vague search of the concept
 - II Locating the learning object in its multimedia form
 - III Precise location of scholarly material e.g. research paper, book etc.
 - IV Replacing the curriculum based material with online material

Following case studies have been made while searching for electronic learning objects in few common search engines, databases and websites.

Case – I: Search in Google

It is quite a normal practice that typing a keyword in the Google search column tends to be providing something as results but in almost all the cases, user has a very vague idea about what he/she wants to search, which gives thousands and millions of results while searching. It is like an opening of an archive which is yet to be catalogued. After searching through a dozen odd entries, if user finds desired information and feel satisfied but if it does not happen, then user just stops attempting further in view of derecognizing the vast capacity of the Google search engine.

By knowing the fact Google has given various search options like Google Images, Google Videos, Google Maps, Google News, Google Books, Google Software, Google Scholar and much more. Even within each of them, there are lot many options. e.g. Google Videos has animation, educational, movies, music videos, sports, entertainment, technology etc sub-columns within it. A very rough search into many of these options revealed that there are more than four million entries within just the videos' segment. Just within educational sub-head, there are around 2.6 lakh entries. After acquiring Youtube.com, the number of these entries is increasing exponentially. This is something that going to take information load in the internet to much beyond even Petabytes (10X trillion X trillion) but this mega info-structure is actually a *relational database*⁶. Whenever any user needs to locate desired information, he/she receives a product of this relational database where entries are coming out in the atomized forms. It is an index of each word and its relationship to nearby words in the scanned objects. It is not what a seeker might have been in need. He/she cannot type the holisticity of one's need both in terms of objectives and net output. The methodology of a search engines breaks the whole

need into the minute fungible objects which though helps in locating but still remains distant from the goal. In nutshell a search engine is something upon which library sciences can depend only partly not fully.

Furthermore, within Google⁷, the extent of reach within its branches of web, images, videos, maps etc, the ultimate output varies a lot. For example, we tried two entries as the keywords in the search box. Initially, we filled the URL www.cec-ugc.org in the Google Web. It took us directly to the home page of the same. Then, we tried the same in the Google Images. It took us directly to the images column of the same site but when we filled the same keyword in the Google Videos, we could find only zero result.

Then tried another keyword from indexing of e-content module in the mass communications category of CEC-UGC in all the three searches made in Google web, images and videos, where, we got no result. It naturally led to the conclusion that search engine technology is in initial stage and evolving. This is primarily because of the fact that this technology has not built itself on the premise of a 'wholesome learning object'; rather, it does not bother to define a learning object. The atomization of the keyword itself is a limitation that puts the learner into a position where he/she will have to depend upon one's own rational capacities to look for what is expected. Even the advanced search options don't solve the problem quite cleverly rather they only minimize the extent of the search to a certain level. The sophistication and specification of the choice should be much sharper so that a knowledge object gets accessible within the shortest and simplest manner.

Case – II: Wikipedia

The second case relates with Wikipedia⁸. Over the last three years, the online and open-source encyclopaedia has turned out to be the world's largest source of immediate information. It is a multi-lingual and a multinational collaboration of a vast number of people. Just in English, it has an entry of 1.5 million articles in addition to lakhs more in many continental languages. More or less, the peer review methodology developed over the period, generally gives a great deal of good results. The associated hyperlinks are an excellent reference material for a user/learner. Not just that, wikipedia has many

sister projects quite on the lines of Google in the form of wikiquotes, wiki creative commons, wikimedia, wikinews, wikiversity, etc. It is quite natural on the part of cyber knowledge to acquire a meta character whether it be Google or Wikipedia. Again, we are nearing the levels of the immensity of archives but does this information qualify for a knowledge management system of a flat world.

In Wikipedia, when learner starts looking for resources in Hindi language, where they end up with the limited information. As far as the information about cultures of developing and least developed countries are concerned, paucity of the same can be felt again. The overall bias was more of Anglo-American. It was an experience of "free yet not free". As far as the methodology of search is concerned, it is more or less simplified from an alphabetically designed search to a keyword based search. It is online encyclopedia with open source qualities. Here, again the search is atomized and does not qualify for a cyber library management system.

Case – III: Merlot's website

The third case study is related with the website of Merlot - www.merlot.org.⁹ This website is dedicated to open source learning where disciplinary information is in the form of course material available either full or part. It covers more than a dozen disciplines particularly of social sciences. It has thousands of articles, papers and course ware in form of PDF files, video lectures and MS PowerPoint presentations in its archives. Some of them do belong to the copyright status but a majority belongs to the copy-left stream. The thematic structure of most of the contributions is quite specific, analytical as well as critical. Even the controversial themes and positions are also being taken up which generally are avoided in Wikipedia but merlot does not have the range or depth of resources as they were in the earlier two. Even if there is an issue of cross-linking different entries in the repository, things are not that well organized. The directory system is not intra-linked seriously. Accessibility of information is not directly proportional to the instructional designs of knowledge e.g. the video lectures are lying independent of other elements of this design e.g. glossary, frequently asked questions, quizzes, summary, feedback or even other hyperlinks/references. They lack the interactivity of a knowledge system. Internet carries information but a library management system shall seek it to be translated into an applied design of some set objectives.

Case – IV: Massachusetts Institute of Technology

The next case study is the website of Massachusetts Institute of Technology.¹⁰ Sections 'Humanities and Social Sciences' and chose 'Political Science' were explored and then further chose 'Globalization, Fall 2005 in it. It was with a great sense of relief that a top quality material seemed within reach at simple click of a button. There were around eight sub-heads within this e.g. discussion, readings, assignments, download etc. When clicked on download, there was again a reference for downloading the zip file which seemed too difficult for a novice. Even it was a text file only. It was a course material but it was not organized into a total learning object. It was a disaggregated piece of learning. The learner would have to choose one's own method of suitability to make full use of such material. He may prefer to go for a full print-out of that material before reading. Even, the depth expected of the material was foreclosed because a lot of good stuff has been put into the proprietary category and is available only through payment mode. Still it needs to be developed as a dynamic learning management system that takes care of multimedia needs of a learning object. That leaves the territory of a librarian quite untouched because simply putting paper text on internet is not going to solve the problem of e-content.

Case – V: Social Sciences Research Network

The fifth case is that of the Social Sciences Research Network.¹¹ Perhaps, this particular website needs not much reference. The reason is that it does not design itself as a learning management system rather it is an archive of e-journals and e-papers. This website provides researchers subject-specific, term-specific, period-specific papers both in free and paid format. A vast chunk of these papers is in the open source. The keyword search can be title or abstract-based. For teachers and researchers who don't have access to costly journals and periodicals in their institutions, this site is an excellent treasure of scholarly information. Quite on the similar lines, the internet provides services like subject guides and research guides discussed in detail in Netspeak¹² The main problem is that it is like a vast tower of knowledge. What a library science professional seeks for is the existence of bridges between these towers of knowledge and these are yet to be strongly and consensually built.

Case – VI: Consortium of Educational Communication

The sixth and final case study is related with the Consortium of Educational Communication¹³, New Delhi. It needs to be mentioned that CEC-UGC is an inter-university body working under the aegis of HRD ministry of Govt. of India. It aims to build a virtual university, one of its own kinds in India. Through its 'learning object repository' various video lectures embedded into that. The beauty of this truth is limited by the fact that this site does not have such examples in plenty. It is a magnificent site of learning but this is not an in-depth site because well-trained e-content developers are required to create such a good knowledge base. This demands a lot of training of teachers. Of course, CEC is focusing on that but there are miles and miles to go. But anyhow, it has given a lead what others can pursue. It does not have an interface with other websites who are into similar quests. It can be quite helpful to knowledge seekers.

One can observe various problems, achieving an understanding from broad to specific towards a solution to these problems- regarding absence of universal archival format, common pathway and definition of learning object in the new realm of multimedia. A need arises of an international standard which can help in making a learning object truly universal so that it can be accessed by anybody in the world which is generally known as globalization of the web. The objective of globalization is to make a web and learning object "linguistically and functionally useful to more than one country"¹⁴

These case studies illustrate that Internet has expanded so fast and so deep into the realms of knowledge that it faces an uphill task of proper organization. The current methods being undertaken to access or retrieve information are of limited nature in terms of their usefulness particularly after the emergence of e-content in its new multimedia format. The digital methods are fast replacing the writing methods associated with pen, paper etc, they are also replacing the way we communicate with one another and they are also redesigning the way classroom lectures are delivered. The six case studies emerged in an era where bandwidth problems discouraged the integration of text-based content into video and audio formats. With the introduction of new Internet Protocols, emergence of technologies like Wifi, WiMax, EDGE etc., things have reached a stage where e-content with its own standards needs to be focused. This takes to the final

portion of this paper i.e. the third section where discussion is on the SCORM, the emerging de-facto standard¹⁵ in the e-learning format.

Section Three

The SCORM published by the ADL project, is an emerging standard for e-learning content. It was initiated in 1997 by the Department of Defence (U.S.A) in the form of Advanced Distributed Learning. The ADL initiative¹⁶ is preparing for a world where communication networks and personal delivery devices are pervasive and inexpensive, as well as transparent to the users in terms of ease of use, bandwidth and portability. SCORM is a suite of technical standards that enable web-based learning systems to find, import, share, reuse, and export learning content in a standardized way. There is a set of services that launches learning content, keeps track of learner progress, figures out in what order learning objects are to be delivered, and reports student mastery through a learning experience. This smart learning management system tries to judge the competency of a learner in respect to his understanding towards the learner object. SCORM enables complex directed learning experiences that go far where most of the web content consists of simple hyperlinks from one page to another. Not just that, this can cater to both categories of learning – synchronous (virtual classroom technology based upon video teleconferencing and video tele-training where students have to be present at specific times at specific places) and asynchronous (instruction and decision aiding anytime anywhere) methods.

SCORM content is made of so-called Shareable Content Objects (SCO) aggregated into a content package. The SCOs are a specialized type of learning object. Each SCO is a unit of content that can be delivered to a learner by a SCORM-compliant learning management system. In order to create a useful learning experience, SCORM consists of three things:

- ◆ Overview – about the model, vision and future.
- ◆ Content Aggregation Model- how to put learning content together so it can be moved and reused.
- ◆ Run Time Environment- how content is launched and the learner's progress is tracked and reported back.

On Nov 16, 2006¹⁷, the ADL initiative has undergone a formal agreement with the Aviation Industry CBT committee (AICC), IMS Global Learning Consortium Inc. (IMS) and the Institute of Electrical and

Electronics (IEEE) to permit their work and derivatives within the SCORM 2004 3rd Edition. In addition to that, it shall also pave its way into the formal submission¹⁸ of SCORM into the International Organization for Standardization (ISO). Then what should be the bothering issues for the academic communities?

1. Is there enough awareness about the need of standards within the realm of e-content so that a debate around SCORM can be built?
2. Are teachers trained in the development of e-content with enough mastery of the new tools of knowledge packaging which are totally different from the 'Chalk and Talk' method being used for ages?
3. How to make the role of a librarian central to these new emerging trends because the domain of teachers will be creating knowledge while those of librarians shall be management of knowledge?

Why these issues are important? The answer is that around ten years back when personal computers were introduced at a mass level in educational institutions, people were so much enamored of MS-Office Tools like MS-Word, MS-Excel and MS-PowerPoint, people almost equated them with true working knowledge of computer operations. But these were all proprietary software which needed to be purchased by the users of developing and poor countries. Despite the availability of free office software like Open Office etc, people never got used to their independence and affordability. Is today not the same situation vis-à-vis SCORM? Will it not be appropriate by big multinational software companies to maximize their profits? What is yet to be critically examined is that four professed objectives of SCORM i.e. Accessibility, Interoperability, Durability and Reusability are really applicable for all the parties concerned particularly a learner both of the flat and yet-to-be flat world. Can it be replaced with an alternative framework without compromising its ideals?

Conclusion

This paper cannot be concluded truly because the basic nature of the paper is quite introductory. It is meant to create a framework of questions within which a focused pursuit of the problems raised can be handled. Various institutions in India like CEC-UGC have been doing extensive efforts to provide electronic learning objects systems to the users. They have not followed SCORM but the kind of serious struggle regarding such a choice and development of an alternative framework deserves a public awareness. What are benefits and risks of such a decision? Do our educational institutions have enough theoretical and infrastructural resources to handle such a momentous shift? All these matters deserve attention particularly those belonging to the professional experts in the realm of library and information sciences. Once they take this issue to centre stage, the world shall be million times safer and aware of this paradigm shift.

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